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season is our crop-growing season; our dry season is our stock-feeding season.

Taking our average of the past ten years, our record as an agricultural State is equal to that of any State in the Union. The great diversity of our soil and climate brings within our reach the production of a great diversity of crops; and if we carefully observe and study all its peculiarities, with a view of adapting all our products to it, there is no good reason why Kansas should not be among the leading agricultural States, if not the leading one, of the Union.

ON THE MAGNETIC DECLINATION IN KANSAS FOR OCTOBER, 1880.

By Prof. H. S. S. Smith, State University, Lawrence.

It is required by the law of this State that each county surveyor shall "compare the magnetic with the true meridian at least four times a year, viz., between the first and fifteenth of January, April, July, and October," and shall report "to the Secretary of State, and" to "the President of the University of the State of Kansas." Up to the present year, this law has been, so far as I know, a dead letter. In September last, the President of the University asked me to take charge of the matter, and the results obtained are as follows. It is to be regretted that the discussion is so partial, but the small number of counties heard from—only 36, in a total of 75 organized counties—renders a complete summation impossible. The total number of reports for January is 12; for April, 13; for July, 14; for October, 36.

The following are the figures, arranged in alphabetical order of counties. I give only those for October, as the small number of reports for January, April and July render any conclusions for those months next to worthless:

Town.	County.	Eastern Declination.
Garnett	Anderson	10° 30′ E.
Great Bend	Barton	10 45 30″
Concordia	Cloud	10 16
Junction City	Davis	10 35
Lawrence	Douglas	9 30 15
Kinsley	Edwards	11 29 30
Ellsworth	Ellsworth	10 43
Ottawa	Franklin	9 37 30
Eureka	Greenwood	10 10 30
Fordham	Hodgeman	11 45 30
Burr Oak	Jewell	11 46
Oswego	Labette	9 44 30
Leavenworth	Leavenworth	9 46
Mound City	Linn	8 30
Peabody	Marion	9 8
Marysville	Marshall	11 45
Paola	Miami	9 35
Beloit	Mitchell	11 3
Council Grove	Morris	9° 20′
Seneca	Nemaha	10 27
Bazine	Ness	11 30
Norton	Norton	11 49
Lyndon	Osage	10 27
Osborne	Osborne	12 20
Minneapolis	Ottawa	11 22
Phillipsburg	Phillips	11 55
Louisville	Pottawatomie	10 57
Hutchinson	Reno	10 35
Survey	Rooks	11 50
Lacrosse	Rush	11
Russell	Russell	11 4
Salina	Saline	11 46 20
St. John	Stafford	11 55
Washington	Washington	10 15
Fredonia	Wilson	10 30
Yates Center	Woodson	10 30

The natural method of treating these observations is to mark on a map the declinations at the several places, interpolate to find points where the declinations are the same, and draw isogonic lines, i. e., lines of equal declination. I have done this on a working map, and the results are far from satisfactory. On the supposition that the reports are all correct, the lines indicate—

1st, That the lines are comparatively regular in the extreme eastern part of the State, and in the western organized counties.

2d, That there is a large area of small declinations, containing the valley of the Kansas as far west as Ellsworth, and extending further from the river to the south than to the north. It contains the part of the Arkansas valley north of that river between Hutchinson and Great Bend, and the valley of the Republican. In Marion and Morris counties the declination is much smaller than in the rest of the area.

3d, The declinations in the valleys of the Saline and Solomon are greater than those in the neighboring portions of the Kansas valley, and correspond approximately to those in the western counties.

4th, The southern parts of the State are not included, as only the eastern counties of the southern rows have reported, and have already been included in the statement concerning the declination in the eastern part of the State.

These results are entirely different from any others of which I have any knowledge. The map showing "the lines of equal magnetic declination in the United States for the year 1875," published by J. E. Hilgard, superintendent of the U. S. Coast Survey, indicates that the isogonic lines in Kansas run regularly, with an average direction of about N. 20° E., and other maps indicate the same. If, then, the reports of the county surveyors are correct, there is here an interesting field for investigation; but the reports are not numerous enough to allow any thorough discussion.

It seems to me, however, that we will get much nearer the truth by making a different supposition, viz.: that the reports are not all correct. Incorrect results can arise from many causes. The following seem to be the most likely to occur:

1st, Imperfect instruments. When a county surveyor uses a shaky instrument, or one whose needle is sluggish and unreliable, I know of no way to remedy the defect, other than by getting a good instrument. If constant errors are suspected, comparison with a good needle might do away with the difficulty.

2d, Carelessness. By carelessness, I do not mean hasty and poor work. Of such a charge each one should be considered innocent until proved guilty. But I do mean the neglecting to humor the needle, to let it swing freely in the box before coming to rest, and to protect it from accidental local attraction. An ax or chain inadvertently left near the instrument, or a pair of steel-rimmed spectacles worn during the observation, will sometimes cause errors amounting to two degrees.

3d, Defective meridian marks. This is probably the most frequent and troublesome cause of error. As a rule, county surveyors are not supposed to be adepts in astronomical operations, and the determination of a true meridian at any point is based on essentially astronomical observations. To do it well, the observer must not only have the knowledge, but must also be provided with suitable instruments—a good time-keeper, and a transit instrument so arranged that the cross-hairs can be made visible at night. A solar compass is a good instrument for the purpose, but is not generally considered as reliable as a portable astronomical transit.

I have no doubt that some way can be devised by which a competent person could be engaged to set up correct and permanent meridian marks at each county seat. At present, I do not know just how such an arrangement can be made. Until some such step is taken, these reports, required by law, and, if well taken, of great use to the landed interests of the State, and of value in the scientific discussion of magnetic phenomena, will remain of comparatively little importance.

BOTANICAL NOTES FROM THE SOUTHWEST.

By B. B. Smyth.

The studies herein contained were made in Barton and other counties of southwestern Kansas, along the line of the Santa Fé Railroad, from 1874 to 1880.

During the spring months, there is no place more beautiful or interesting to the passer-by or the botanist than the prairies of the southwest. The abundance, beauty and size of many of the flowers causes cerain spots to rival some of the showy Eastern flower gardens. A study of these plants and flowers is not without attending difficulties. Very many of the plants are different from those growing east of the Mississippi, and are not described in the Botanies of Wood or Gray. A Synopsis of the Flora of Colorado, by Porter & Coulter, contains many plants of western Kansas; though there are still others of which descriptions are not readily attainable. I am under obligations to Prof. J. H. Carruth, of Lawrence, State Botanist, also to Prof. Wood, of New York, for the determination of many plants of which no description is at hand.

In March, there are two plants, besides a little carex three inches high, that open their blossoms, sometimes partly under the snow. One is a little wild parsnip, three inches high, with umbels of very small, white, fragrant flowers. It is said to be Peucedanum nudicaule, though the plant differs from the description in the following respects: the name nudicaule indicates a naked stem, while the plant is well covered with leaves half-way up the stem, and that portion of the stem below the ground—three inches of it—is entirely sheathed with radical scales and leaves. Then the leaves, instead of being bipinnate or ternate-pinnate, are bipinnately or terpinnately divided—the segments pinnatifid or bipinnatifid. Occasionally the seeds are